DOCUMENT RESUME

ED 115 768 CE 005 589

AUTHOR Johnson, Charles E.; Shearron, Gilbert F.
TITLE Specifying and Writing Occupational Competencies.
PUB DATE 75
NOTE 29p.

EDRS PRICE MF-$0.76 HC-$1.95 Plus Postage
DESCRIPTORS Educational Programs; *Instructional Design; *Job Analysis; Job Training; *Performance Based Education; *Performance Criteria; Program Descriptions; Vocational Education

ABSTRACT

Competency Based Education (CBE) is a system of instruction which holds that the learner has completed his preparation only when he effectively does the job he has been learning to do. Three major assumptions which form the basis for CBE are: (1) an educational program should prepare the student with competencies to effectively do the job he is learning to do; (2) an educational program should make the best use of all resources; and (3) an educational program should be designed, developed, implemented, and revised by management approaches which effectively and efficiently operate all of the various parts of the program in concert. Occupational competency may be classified as skill oriented or process oriented. Personal attributes complement the training of an occupational competency. The preparation of statements for competencies requires more detailed descriptive statements to help others understand what is meant when the competency statement is used. Four sources for identifying competencies for any given occupation include job performance, analysis of job description, product analysis, and consensus. (The document is presented in a simplified approach to introduce CBE to those unfamiliar with the more complex concepts in much of the available literature.) (Author/EC)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

DEC 1 1975

ED115768

SPECIFYING AND WRITING OCCUPATIONAL COMPETENCIES

Charles E. Johnson, Ed. D.

Gilbert F. Shearron, Ed. D.

1975

College of Education
University of Georgia
Athens, Georgia 30602

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

CE005589

Preface

This booklet is an introduction to competency based education (CBE) as the authors understand and use this concept of educational program design, development and implementation. It is written to be understood by persons who want to know about CBE but are not sufficiently oriented to read without considerable effort much of the available literature on this subject.

Because this presentation is to a large extent a "simplified approach" it is subject to the justifiable criticism of those scholars who insist on preciseness in the definition of terms and consistency in the use of those terms once they have been defined.

Charles E. Johnson
Gilbert F. Shearron

COMPETENCY BASED EDUCATION

Competency based education (CBE) is a system of instruction which holds that the learner has completed his preparation only when he effectively does the job he has been learning to do. CBE maintains that the more traditional systems of education are characterized by students accumulating, organizing and classifying knowledge, or by participating in required learning tasks. CBE maintains that these learning activities are insufficient preparation for actually performing effectively on-the-job.

CBE holds that competency is primarily reflected in what a person does. Subject matter, skills and attitudes are considered essential enablers for performance. But even though they are essential, they are of little value without the performance since they by themselves can not satisfy the objectives required of the practitioner, whether he be a professional, a scholar, a technician, an artisan, a tradesman or a citizen assuming his social obligations.

Since its inception a few years ago, CBE has been steadily making its mark upon American education. It began with programs to prepare classroom teachers in about 1970. In February, 1973, a study of 1200 teacher education institutions revealed that over 40% either had CBE programs or were in the process of developing them.[1] Competency based teacher certification was soon mandated in numerous states, and contemplated in many others.[2]

---

[1]Schmeider, Allen A., Competency-Based Education: The State of the Scene. American Association of Colleges for Teacher Education Performanced Based Teacher Education Series: Number Nine. Washington, D. C.: AACTE, 1973.

[2]Wilson, Alfred P., and William W. Curtis, "The States Mandate Performance Based Teacher Education," Phi Delta Kappan. September, 1973, pp. 76-77.

CBE is of course not limited to professional educators. It is a suitable approach effective for preparation in any vocational pursuit. It is soon likely to be common practice in most technical and vocational schools, community colleges and even on-the-job training programs in the major industires and services. Presently there is evidence that it is being tried as an approach for the preparation of engineers, chemists, physicists, veterinarians, dieticians, business administrators and others in professional and technical fields.[3]

You may have heard the term performanced based education and this could confuse you. Most people use the terms competency based and performanced based interchangeably.

Another confusion often exists between the two terms competency based education and competency based licensing or certification. Here there is a definite difference and it lies in the common meanings for the words education and licensing. Competency based education prepares a person with whatever it is he needs to do his job effectively. Competency based licensing gives him authorization to perform the job provided he demonstrates that he can actually do the job effectively.

Competency based education is therefore not a prerequisite to competency based licensing, nor is the reverse true. A state licensing agency can have a competency based licensing program for say nurses, dieticians, or teachers which will provide these people with their licenses as soon as they demonstrate that they are competent. They do not have to have been trained in competency based vocational preparation programs. On the other hand, any number of inservice, school or college vocational preparation programs

---

[3]Capie, William and Glenn C. Markle, Editors. A Model for the Academic Support of Competency Based Teacher Education. Competency Based Education Center and Georgia Science Teacher Project, University of Georgia, Athens, Georgia. 1974.

could be competency based and the licensing system, if any, could still be a conventional approach which gives attention primarily to test scores, courses completed, grades earned, and/or the personal recommendation of people who know the applicant.

The Assumptions Underlying CBE

There are three major assumptions which form the basis for CBE. None of them is entirely new.

The first major assumption is that an educational program should prepare the student with the competencies which he needs to effectively do the job which he is learning to do. That is, the base or foundation for the whole program should be the kinds of things a person has to do successfully if he is to do the job well when he is on his own. There are of course many elements to a competency. Performance is only one. Others include knowledge, skills, and attitudes. These will be discussed later.

The second major assumption is that an educational program should, without in any way sacrificing the desired quality of its objective, make the best use of all of the resources which it has. This includes the instructor's time, the student's time, the learning materials, the equipment and more. For example, this means that when the program is designed and developed it should take into account that students differ in how much they know, how they learn, and how fast they learn. It would normally be a waste of resources to have all students learning from the same book in the same manner and at the same rate.

The third basic assumption is that an educational program should be designed, developed, implemented and revised by management approaches which, while providing for humanization, effectively and efficiently operate all of the various parts of the program in concert. By parts of the program is meant such activities as student selection, orientation and induction,

staff inservice education, program evaluation, student counseling, and of course the instructional program per se. For many this means the use of what is popularly called systems management or management by objectives.

In short, CBE uses objectives directly related to actually doing a job (not just learning about it), makes realistic allowances for differences among learners and is so managed as to conserve available resources -- both human and material.

These three major assumptions may also be thought of as principles or the generalizations which are used as a basis for designing, developing and implementing the educational program. They are the ones which distinguish CBE from other approaches to education such as the subject matter, core or experience approach. CBE has a number of other principles which are not distinguishing, but they are essential if you are to have a good CBE program. Many of these essential principles reflect practices which may be found in other approaches to education. Here are some:

1. A program should provide for differences among learners.
2. A program should provide for the humanistic development of the learner.
3. A program should keep up with the changes which are taking place in society. (It should be relevant.)
4. A program should be self-improving; it should provide for its continuous evaluation, feed-back and revision.
5. A program should be responsible for the extent to which capable and willing students make progress.
6. A program should involve in its governance anyone who is affected by the program.

CBE Program Practices

Because CBE gives preference to a particular combination of princi-

ples, many of its practices differ significantly from those seen in common programs. The following list[4] points out how some CBE practices differ from those found in more common educational programs.

Characteristics of CBE Programs	Characteristics of Common Programs
a. The main indicator of the student's achievement is his ability to do the job for which he is preparing effectively and efficiently.	a. The main indicators of the student's achievement are his knowledge of the subject and his ability to tell how the job for which he is preparing may be done effectively and efficiently.
b. Once a student has demonstrated his ability to do the job for which he is preparing he has completed his preparation. Time is not a factor. He may finish earlier than others or take more time than usual if need be the case.	b. The student operates within specified time limits such as academic years, semesters, and quarters. Class hour requirements are generally adhered to.
c. The criterion of success is demonstrating one's ability to do the job. Mastery criteria are used to determine how well the student performs. He must satisfy these criteria if he is to be considered competent.	c. The criteria of success are letter grades which indicate the extent to which the student knows the required subject matter, or has carried out a particular learning activity.
d. Flexible scheduling of learning activities is essential to provide for individual differences among students. This allows for year-round educational opportunities and numerous possible times for enrollment.	d. Students are scheduled for instruction into fairly rigid blocks of time. The academic year and infrequent mass registration are standard practices.

---

[4] Johnson, Charles E., "Competency Based vs. Common Educational Practices." Unpublished manuscript. College of Education, University of Georgia, Athens, 1972. A revision was prepared, edited, and has been tentatively accepted for publication in Teacher Education Journal sometime in 1974-1975.

e. There are no fixed rules as to how, when or where learning is to be accomplished.	e. On-campus classroom teaching is the most common approach to instruction. Lengthy on-campus required attendance is standard.
f. Opportunities are provided to acquire the performance as well as other components of competencies in practical field experiences of on-the-job.	f. Practical field experiences are limited.
g. Learnings (competencies) are presented in small learning units or modules, combinations of which help the student acquire enablers essential to the performance of specific competencies.	g. Learnings (subject matter) are organized into courses representing academic time units.
h. Provision is made for differences among students in their styles of learning by providing them with various alternate paths to acquiring competence.	h. Lecture-discussion is the most common mode of presentation. It is however supplemented by seminars, laboratory activities and limited field experiences. Little attention is given to the student's style of learning.
i. The criterion for a "good" instructor is the extent to which he is effective and efficient in helping his students acquire the competencies which they are seeking.	i. The criterion for a "good" instructor is how much he knows about his subject and how well he presents it.
j. There must first be consensus as to the mission of the program; then an organization and operational strategy which is judged as most effective and efficient in fulfilling the mission is selected or designed and implemented. This usually involves all who affect or are affected by the program.	j. Management is organized around departments and divisions. This organization is regarded as that within which the mission is most effectively and efficiently fulfilled. Departments and divisions sometimes differ in their interpretation of the mission.

k. Criteria for staff selection are based on the needs of the instructional components of the program which affect the learner. Differentiated staffing for instruction and team teaching are commonly practiced.	k. Criteria for staff selection are usually based on department's needs. Differentiated staffing for instruction and team teaching are not commonly practiced.
l. Humanization and personalization are systematically planned for as an integrated part of the educational program.	l. Humanization and personalization are endorsed as essential but little systematic provision is made for it. For the most part it is left up to the individual instructor to respond to student's special needs.
m. Continuous evaluation, feed-back and revision of the program are systematically implemented by persons who regard this as this major concern.	m. Program change occurs when there appears to be need for change. These changes usually take the form of innovations imposed on the basic pattern.
n. Specifying the competencies to be acquired by the learner (as well as all other aspects of governance) is accomplished by involving practitioners, supervisors of practice, college instructors and professors, the learners, and the interested community -- anyone who affects or is affected by what the student is taught.	n. Subject matter is selected and organized primarily by the instructor or professor who teaches the course.
o. The instructor shares accountability with the student for the extent to which the student acquires the desired competencies within the restrictions suggested by the student's ability and desire to do so.	o. The student is held accountable for acquiring the target subject matter as organized and presented by the instructor.

COMPETENCIES

Nearly everything that we have learned to do could be called a competency. It is a competency to skip rope, get a meal, drive a car, read a book, play a musical instrument, hit a baseball, tie our shoes, or take a test. There are hundreds of others. But competency based education is concerned with certain kinds of competencies only -- those that an instructional program is designed to [illegible]quire. Usually competency based education is associated with an occu[illegible]us, we are usually talking about educational programs based on competencies needed by such persons as teachers, dentists, carpenters, salesmen, hairdressers, or some other profession, trade or technical pursuit. However, it would be quite in order to base an educational program on the competencies needed for academic liberation, citizenship, or simply literacy.

Note that a competency is something that you have learned to do. For example, if you learned to drive a car you possess that competency. However, to drive a car from one place to another is not enough evidence in itself for the driver to be declared competent. A person with a little luck and some technical knowledge might make the trip safely but still not be a competent driver. He might not be aware of certain laws. He might not be respectful of the highway rights of others. He might not know enough about highway safety, how to maintain equipment, or how to drive vehicles other than the one he drove.

Most competencies used in technical pursuits or in professions are not quickly and easily acquired. It usually takes considerable practice. Thus, some occupations do not consider their beginners ready to be on-their-own until after some designated time period internship or apprenticeship under an experienced licensed professional worker.

The authors define a competency as a rational performance which satisfactorily meets the objectives for a desired condition.[5]

Clarifying the key words in the definition, rational means that the performer has direction and purpose. He knows why he is doing what he is doing. He may have even developed and considered many alternative strategies before he selected the one which he uses.

Performance is what he does. It may be an observable behavior but it is usually more than that. It includes such unobservable operations as manipulating ideas and the making of judgments and decisions.

Satisfactorily is used to indicate that a competency need only be adequate or sufficient. By using this word the definition avoids the implication that a competency is a highly "polished" or proficient act. At the same time, it suggests that factors associated with efficiency can not be overlooked.

The term objectives is synonymous with "specifications," which indicates that the hoped for outcomes have been defined in fairly detailed terms.

A desired condition is a state of existence in which some specific need or want is likely to be satisfied. This need or want might be the changed behavior of some individual or group, a tangible product or idea, an answer to a question, a means of resolving a problem, or a plan or strategy to accomplish some mission.

There are many different kinds of competencies. There are those personal or common competencies which we use in daily living. They range

---

[5]Johnson, Charles E., Gilbert F. Shearron and Nancy H. Hensel. A Meaning for Competency. A Working Paper. Competency Based Education Center, College of Education, University of Georgia, Athens, Georgia. pp. 5-6.

from bathing, dressing and getting breakfast to keeping family accounts, making long distance phone calls and rowing a boat. This book is however concerned primarily with those competencies which are used as the bases for instructional programs. It focuses primarily on preparation for occupations. Thus, here we are mostly concerned with occupational competencies.

Among occupational competencies some are skill oriented and others process oriented. We also hear about generic competencies and enabling competencies.

A skill (oriented) competency is a relatively mechanical act. It is usually carried out in just about the same manner each time. There is usually a premium for technical and precision. Illustrations of skill competencies include: He tunes pianos. He sets type. He mounts automobile tires. He operates motion picture projectors. Skill competencies are sometimes called technical competencies and are not usually thought of as requiring a great deal of originality or creativity. For example, it is not usually a wise plan to be creative in threading a motion picture projector. On the other hand, a creative contribution by a so-called technician can lead to streamlining rather complex technical operations.

Process competencies differ from the others primarily in the extent to which they carry with them the responsibility for decision making. Normally they demand the kinds of activities which we associate with problem solving. These competencies are much more likely to call upon creativity than do others. For example, in the medical profession a key process competency is diagnosing; another is prescribing. In management, process competencies might include designing strategies, and in teaching, they might include evaluating learner progress, and identifying learner needs.

It is probably true that all occupations demand both creative and routine behavior, that all at some time demand that decisions be made and that all are at times dependent upon precision. Also, a person might classify a competency as a skill and later after he has seen it demonstrated at a high level of proficiency change his mind because of the display of problem solving, creativity and artistic expression observed. Thus, the reader is cautioned against regarding skill and process as discrete terms. Such is not intended. When discussing occupational competencies we sometimes hear mention of generic competencies. Generic is just another word for general, and thus generic competencies are those which are generally essential to the occupation. For example, in the profession of management there is a generic competency which has to do with making cost analyses. Everyone who is an effective manager should be able to make a cost analysis for the operations which are his central concern whether he be a manager of an industrial plant, a food store chain, or a hospital. Thus, He makes cost analyses. is a generic competency for managers.

Most competencies are complex. This is especially true of what we have called process competencies. To carry out such a competency a person needs certain specific knowledges, skills, processes and attitudes. Some of them are very obvious and some almost subtle. The amount of each of these needed to carry out a competency varies from competency to competency. That is, some competencies are more dependent upon knowledge than are others. So also are some more dependent upon process or attitude than are others. For example, a technical competency like operating a motion picture projector doesn't require the variety of knowledge, or depth of feeling as does the process competency of designing a module for an electronic unit which meets the specifications suggested by a technical report.

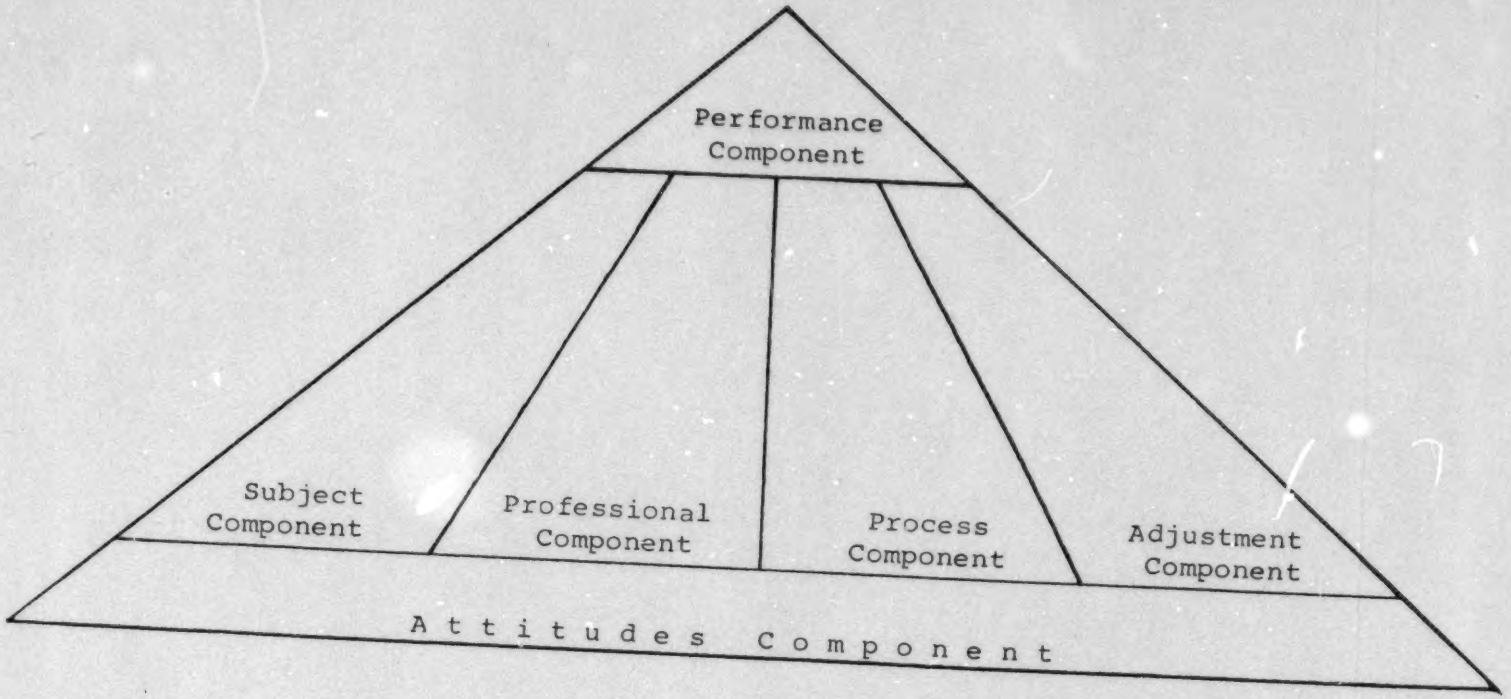
The diagram on the following page is one used to show the parts of a process teaching competency.[6] In this case the parts are called components. This diagram shows a relationship among the components but it does not effectively communicate the notion of interrelationship because it graphically separates the so called components one from the others when is reality such a separation does not exist.

The reader must keep in mind that this diagram represents a specialized kind of competency. It is for teachers, thus there are two kinds of subjects -- the subjects they teach, and the subject of how to teach. Also, it is representative of a process competency as distinguished from a skill competency; thus, the area representing performance is proportionally smaller than it would have been had it been skill or technique oriented.

Each occupation probably has need to construct a graphic representation of what it regards to be the anatomy of its competencies. The chart in figure 1 has proved helpful in analyzing into elements those generic process competencies most frequently recognized as essential to teaching.

---

[6] Johnson, Charles E., Gilbert F. Shearron and Nancy H. Hensel. A Meaning for Competency. Competency Based Education Center, College of Education, University of Georgia, Athens, Georgia. 27 pages.



Performance component contains observable behavioral elements of the performance associated with the teaching competency.

Subject component contains elements of the competency directly associated with the instructional objectives or subjects to be taught which enable perfcrmance of the competency.

Professional component contains elements of the competency associated with professional education which enable performance of the competency such as principles, strategies, and techniques.

Process component contains thought processing elements which enable the implementation of the teaching competency.

Adjustment component contains elements essential to the individual's adaptation of his personal characteristics to the performance of the competency.

Attitudes component contains enabling elements of attitudes, values and feelings essential to the performance of the teaching competency.

Fig. 1. Graphic representation of a professional teaching competency.

MORE ABOUT COMPETENCIES

By simply observing someone carrying out a job we can not be certain that he has a particular competency. He may only seem to have it. Sometimes we refer to such a person as one who "talks a good game". We might also call him an "actor", because acting is an example of a situation where we are supposed to attribute competencies to people who seldom really possess them. For example, TV "doctors", "lawyers" and "detectives" are not likely to be competent in these occupations in real life. If we want to be certain that a person is competent we must take into account all of the dimensions of the competency and carefully examine such aspects of his being as what he does, what he knows, and how he feels. It is only then that we can tell whether or not he is really competent.

As regards competent behavior it may also be observed that people differ in the style or manner in which they carry out competencies. This is especially true of what we have called process competencies. The principle of individual differences applies here just as it does to all other human behavior. Personalities, values, aptitudes, special skills, and experience all affect the ways in which a person conducts himself as he engages in a competency. The more complex, creative, or "process oriented" the competency the more likely it is to be implemented in a different fashion each time it is carried out even by the same person.

Most people must practice or use a competency if they expect to retain it. As with any other human behavior if we do not practice it or if we acquire some physical or mental handicap which interferes with our performance we tend to become less effective. No matter how infrequently we use a competency or how drastic the interference over a period of time we usually retain some of the elements; thus, we have not lost it altogether.

Therefore, if a person has not changed a great deal mentally or physically over the period of time during which he has not used a particular competency, he will probably find it relatively easy to regain.

However, in any technical or professional endeavor conditions are changing rapidly and modifications of competent performances as well as new competencies are being introduced from time to time. Thus, we must carefully validate by evaluation any person who purports to have reclaimed a competency he has once had, to be certain that he possesses it as it is needed for current practice.

Personal attributes are sometimes confused with occupational competencies because both are important to occupational performance. For example, to be conscientious, to have empathy, to have feelings of acceptance for others, or to be interested in your job are personal attributes. They may be essential to your job but they, in and of themselves, are not occupational competencies. For example, being tall is a rather well accepted requirement for a professional basketball player; here, being tall is a physical persona- attribute; it is not a competency. It is a condition that permits one to acquire and carry out certain competencies related to playing basketball. Here is another example: there could be an elementary school teacher who proficiently specifies learning objectives, selects appropriate materials and designs efficient learning activities, but is ineffective in teaching children because he or she lacks sufficient empathy, acceptance and love to effectively guide children toward the goals of the educational program.

What appears to be one difference between personal attributes and competencies is that most people agree that whereas occupational competencies are learned and can be taught (provided the students have normal

aptitudes for the job) most personal attributes either can not be taught or are very difficult to teach in a short time. For example, height and color of skin are fairly good examples of some personal characteristics which most believe can not be changed by education. On the other hand there is dispute regarding such characteristics as conscientiousness, industry, and ambition. Some would maintain that educational programs in technical and professional schools can and should teach these personal characteristics. Others say such schools should select students who already have these personal characteristics and thus save time, concentrating on helping these better qualified students acquire the occupational competencies they need.

There are those who single out artistic aptitudes as different from other personal attributes. They hold that the basic "talent" needed to perform effectively in such arts as music, dance and design can not be taught effectively through instructional programs. They believe that one should attempt to define the artistic qualities needed for any particular occupation and then select candidates who have the artistic aptitude or potential for it. For them this is preferably to admitting "just anyone" to the program and then attempting to instill in that person the potential or the characteristic itself.

It may be that someday we will find that any personal characteristic can be learned with the efforts of skilled teachers. However, some persons have more potential for acquiring particular characteristics than do others. Therefore, the basis for decision rests on the availability of resources and the extent to which potential can be identified in a human being.

In general it is probably a simpler matter to help someone acquire an occupational competency than it is to change his personal attributes. Therefore, it is recommended that in selecting persons for a technical or pro-

fessional pursuit that consideration be given to selecting persons who already have the required personal attributes, or are favorably disposed toward acquiring them.

PREPARING STATEMENTS FOR COMPETENCIES

A statement of a competency is only a name (or graphic referent) for a complex performance. For example, let's consider: The competent sales manager designs sales promotion strategies. If we were to design an educational program around a set of competencies which includes this one. we would have to know a great deal more than is contained in this statement per se. We would have to know what facts, skills, processes and attributes are essential to the performance of this competency. Indeed one could compile a voluminous list of facts alone that some would declare essential to the functioning of this competency. In addition, there are the skills, processes, attitudes and the unified whole which is the competency itself. Thus, to plan programs we must recognize the differences between a statement of a competency and the competency itself.

Another important reason why it is necessary to distinguish between a statement of a competency and its conceptual model is that were we to prepare someone to do only what the statement says, we would be in no danger of training persons to act like they are competent rather than to act competently.

In general a statement of a competency is a referent for what a person does to accomplish one out of many major tasks which are, in concert, judged by recognized authorities to be essential for him to perform acceptably if he is to be considered a satisfactory worker. In general, it focuses on what he does. For examples:

--Drives a tractor

--Prepares reports of chemical analyses.

--Operates common creamery equipment.

--Drafts architectural plans for homes.

--Repairs automobile "flat tires".

--Replaces tailpipes and mufflers on automobiles.

We underscored the words "one out of many major tasks" in the above paragraph to call your attention to the fact that normally we make lists of many different competencies needed to carry out a particular job. But, what to one person is a single competency might to another person be the whole job. Any one of the competencies suggested above could be a job in and of itself. On the other hand, it could be one part of another job. In the task of specifying competencies we must first determine the limits of the job. Then and then only can we break it down into its components which here we are calling competencies.

Note also that in writing the above illustrative competencies the authors have prefered to state them in the present tense in such a fashion as to describe what is happening when the competency is being carried out. An English teacher described it to the authors thus, "The predicate of the statement uses an active, present tense, third person singular form of a verb which depicts action." Needless to say the authors prefer to think of it simply by the earlier statement, but respect the grammarian's analysis.

Another point to observe is that these competency statements are so worded that they suggest the performance of the worker rather than that of the instructor or some other person in the learning environment.

In considering what makes a good statements of a competency we should consider for a moment what kinds of statements are sometimes confused with statements of competencies. For examples:

--A statement which tells how much the worker knows about what he is doing.

--A statement which tells how well the worker thinks.

--A statement which tells how fine the worker's personal qualities (dependability, conscientiousness, courteousness, vigorousness, etc.) are.

--A statement which describes a learning activity which the worker should carry out in order to acquire a competency or to improve in it.

--A statement which tells how the worker feels about his job or people and things associated with his job.

--A description of a relatively simple skill which is necessary if the worker is to effectively carry out the competency. (For example, threading a motion picture projector is more of a minor skill than a competency if the competency is concerned with operating various communication media equipment.)

Because competency statements are relatively broad statements which serve only as referents for the more complete competency itself, it is necessary to prepare more detailed descriptive statements which help others understand what we mean when we use the competency statement. Thus, one normally finds many paragraphs of narrative on file in some location which tell what the statement of a competency represents in concept. One tool often used to assist in this process is an indicator. An indicator is a referent for an occurrence, product, or human act which provides evidence that the competency with which it is associated has been or is being performed.

CLASSIFYING COMPETENCIES

The preceding pages have outlined four sources for identifying competencies for any given occupation. There are, of course, more----especially when attention is given to the major concerns of particular occupations in contrast to others. For example, one might consider the Goals of American Education as an initial source for the competencies needed by public school teachers, or one might give considerably more attention to personal safety

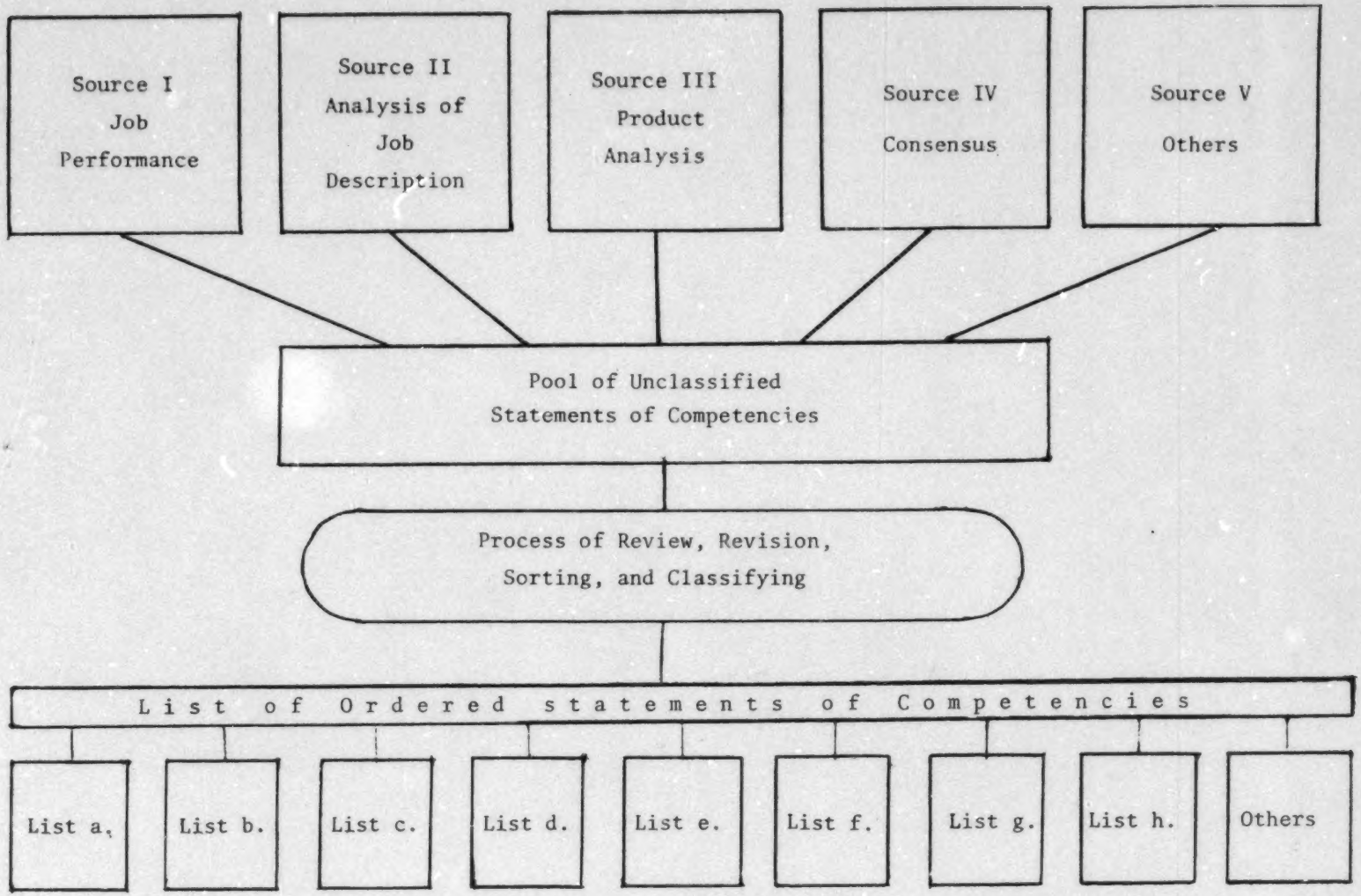


Fig. 2. A process for classifying competencies.

and health when specifying competencies for "dangerous occupations". As more sources are considered, the task of ordering and/or classifying the competencies becomes greater.

Figure 2 shows the highlights of a process by which competencies may be classified. It begins with the aforementioned sources. Each source makes its contribution to a pool of statements. From the pool, the statements are drawn and classified. In the process of classification, duplicates are discarded and those remaining are edited and sorted into what evolves as "areas of competence". Within each area of competence for the occupation one finds more specific statements which are representative of competencies. These competencies may then be represented by more detailed statements which resemble criteria in that they are the specifics which represent the competency.

Practically, this process of sorting and classifying is lengthy and much more arbitrary than the above discourse suggests. In general, it provides a workable list of competencies with a breakdown of enablers and criteria, but as yet the authors (who have followed this process with a number of groups) have never experienced a neat fallout of statements into clearly identifiable packages with orderly arranged sub-points.

SOME SOURCES USED FOR IDENTIFYING COMPETENCIES

The competencies needed to form the basis for an instructional program may come from many different sources. There is probably no one source which is best. It is the responsibility of those who are to specify the competencies to select the sources and define the procedures which, in their opinion, will best satisfy their needs.

Four sources for identifying competencies are presented and briefly

discussed on the pages which follow. The four are: Analysis of Performances, Analysis of a Job Description, Product Analysis, and Consensus.

Analysis of Performances

The analysis of performances method is simply observing workers on the job and preparing a comprehensive list of all the tasks which they do. For example, making a list of all the tasks performed by a group of plumbers in a week or a month would reveal most of the specific skills and abilities plumbers in general must have in order to fulfill the demands of that skilled occupation. This list yields valuable data for specifying competencies essential to specific occupations, but should never be regarded as an adequate sole source.

The strength of this method is that it includes the actual demands of the entire job. It does not reveal just those which some teacher "thought" were important enough to include in the instructional program.

Analysis of Job Descriptions

It is not unusual today to find that the responsibilities of particular jobs within a profession or technology have been summarized in job descriptions. Consulting this source frequently suggests essential occupational competencies. Figure 3 is a job description written for a photographer employed by a university. The following are illustrative of the competencies that are suggested by the contents of this description:

1. He photographs activities in still and motion pictures; in color and in black and white.
2. He makes photographic reproductions of typed copy, drawings, photographs and other materials for the preparation of visual aids, slides and transparancies, or for reproduction in education and scientific journals.
3. He maintains effective working relationships with the staff.
4. He maintains the photographic equipment in good order.

UNIVERSITY PHOTOGRAPHER

NATURE OF WORK

This is skilled work in all phases of commerical-type photography.

Work involves a variety of photographic assignments, including still and motion picture photography, in black-and-white and color. The employee operates a number of still and motion picture cameras, microfilm cameras, and a variety of studio and darkroom equipment. Work is carried out with considerable technical independence. Work is reviewed by observation of results.

ILLUSTRATIVE EXAMPLES OF WORK

Photographs assigned activities of the University in still and motion pictures and in color or black-and-white for public relations purposes.

Makes photographic reproductions of typed copy, drawings, photographs and other materials for the preparation of visual aids, slides and transparencies, or for reproduction in education and scientific journals.

Processes and prints films; employs special skills such as microphotography; microfilms newspapers and books.

DESIRABLE KNOWLEDGES, ABILITIES AND SKILLS

Considerable knowledge of the techniques, equipment and materials used in modern photography.

Considerable knowledge of the methods and techniques used in developing and processing films.

Ability to operate a variety of photographic equipment and achieve acceptable prints.

Ability to photograph and edit motion pictures of various events and projects.

Ability to prepare photographic material for reproduction.

Ability to maintain effective working relationships with staff.

Skill in the use and maintenance of photographic equipment.

DESIRABLE TRAINING AND EXPERIENCE

Graduation from a standard high school or vocational school, and considerable experience in commercial photography, or any equivalent combination of training and experience.

Figure 3

5. He edits and splices motion pictures.

Here again is a source which is productive, as are others, but should not be considered an adequate single source.

Product Analysis

Product analysis when used with reference to specifying vocational competencies for an educational program means examining a product to determine what human processes were involved in creating it. Generally we think of a product in manufacturing terms; for examples, boxes of cereal, cans of paint, building blocks, and pencils. However, a product can be anything that is produced as a result of the workers efforts and skills. For the cabinet maker it might be a complex of hand made cabinets. For the mechanic it might be a well tuned engine. For the dental technician it might be a healthy and clean set of teeth. For the English teacher it might be a student's creative poem. For the soloist it might be a stage performance. In each case, if product analysis were used to determine the vocational competencies, the question asked would be, "What human processes were essential for the creation of this product?"

Consensus

When using consensus for specifying competencies, one brings together a group of specialists in a certain field. Structural engineers, for example, get together in a relaxed atmosphere and brainstorm with each other as to what kinds of characteristics an engineer ought to have if he is to be a qualified member of their profession. The brainstorming must be limited to what the engineer should be expected to do, not what he knows. During the reflective thought process, the suggested competencies are listed.

REVIEWING AND REVISING COMPETENCIES

When an instructional program has been in operation for sufficient time to allow its "graduates" experience in practical situations, it is possible to visit and observe these trained workers for the purpose of determining the success of the program. Such observations will normally yield data which suggest that some aspects of the program need correcting. Sometimes these are the competencies which are the basis of the program. For example, it may be found that certain competencies which were taught were not the ones the workers needed, or what they learned to do was not precisely what was needed for their particular situation. These observations provide important feedback, and on this basis competencies can be revised. A discrepancy between what was thought to be needed and what was actually needed on the job can result from a number of things --- misunderstandings, oversights or changing conditions. So without reworking the entire program, certain competencies can be respecified to accommodate the weaknesses of the program.

Another condition where competencies may have to be revised occurs when there is a discrepancy between what was specified to be acquired and what was actually acquired. If the same results occur during retraining, especially retraining under new conditions, the competency may be suspect.

A third condition which will demand attention is where a student has acquired the competency in training and demonstrates it with adequate proficiency but has no use for it on the job. These three conditions suggest that there are likely to be many more.

A CLOSING NOTE

This book deals primarily with one aspect of competency based educa-

tion: competencies as they are used in educational programs designed to guide learners in preparing for vocational pursuits. It gives only a brief theoretical and technical overview of the nature of CBE. There is much more to CBE than one finds here. Other components of CBE which should be explored are: management and governance; management of instruction; sequencing the enabling competencies for instruction; learner selection, induction and orientation; evaluation of the learner, and evaluation of the program.